Giuris (Teleostei: Eleotridae) from Indonesia, with description of a new species

by

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Abstract. – Indonesian *Giuris* species are reviewed and compared to the known species described from the area. Three species are recognized including one new species, which is described in this paper using genetic and morphomeristic approaches. The three species differ by a high percentage of divergence in partial *COI* gene (652 bp) and by several characters including the number of pectoral fin rays, the scales in transverse forward series, the scales around the eye and the interorbital length.

Résumé. – *Giuris* (Teleostei : Eleotridae) d'Indonésie, avec description d'une espèce nouvelle.

Des spécimens de *Giuris* provenant d'Indonésie ont été étudiés et comparés aux espèces décrites de la région. Trois espèces ont été répertoriées dont une nouvelle, qui est décrite dans cet article en utilisant des approches génétique et morphoméristique. Les trois espèces diffèrent par un fort pourcentage de divergence au niveau du gène *COI* partiel (652 pb) et par plusieurs caractères incluant, principalement, le nombre de rayons aux nageoires pectorales, le nombre d'écailles en série transverse antérieure, l'espace interorbitaire et le nombre d'écailles autour de l'œil.

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Giuris Sauvage, 1880 species are colourful freshwater eleotrids found in insular habitats of the tropical Indian and Pacific oceans. Many species have been described since 1837, but the genus has never been reviewed or revised. The genus is widely distributed and has been collected in many coastal streams from estuaries to lower parts of rivers, or in lakes, usually in bank vegetation and in shelters over rocky or gravel bottoms.

In their study, Akihito and Meguro (1974) gave the most important characteristics of the genus compared to *Ophiocara*: the absence of a process on the inner side of the maxillary; the absence of an oculoscapular canal and supratemporals and the presence of a short preopercular canal with the pores N' and 0'; 15 segmented caudal fin rays; 25 vertebrae and the first pterygiophore between the third and fourth vertebrae or the first two or three pterygiophores between the fourth and fifth vertebrae; the presence of a short, low longitudinal ridge on frontal.

Only one valid species is currently assigned to *Giuris, Giuris margaritaceus* (Valenciennes *in* Cuvier & Valenciennes, 1837) (Kottelat, 2013; Fricke *et al*., 2020), but a dozen of synonyms were assigned to this species. Kottelat (2013) considered that this name is the oldest available and valid name for the above species, and he stated that 'the wide

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distribution and the observed variability of *G. margaritaceus* suggest that more than one species might be confused under this name'.

The most striking features of *Giuris* are the remarkable distinctive colour patterns, but different in mature male and female. There is limited information on the ecology or biology of *Giuris* species: they are possibly amphidromous; they are mostly carnivorous and feed on small shrimps, aquatic insects and fish (Keith *et al*., 2010). In New Guinea, Allen (1991) reported that "a female lays a large number of eggs (100 000 to 220 000) on the substrate. The reproduction takes place all year round, with however a peak during the wet season."

Many surveys of rivers have been carried out in Indonesia during past 10 years with many *Giuris* specimens collected, particularly during collaborative work between the Institute for Research and Development (IRD), the Indonesian Institute of Sciences (LIPI) and the National Museum of Natural History of Paris (MNHN). These expeditions into remote areas (West Papua, Sulawesi, Kalimantan, Sumatra, Java, Lombok, Bali, Halmahera, Ambon and Ceram) have resulted in the collection of many gobies and the discovery of several new species (Pouyaud *et al*., 2012; Keith *et al*., 2011, 2012, 2014a, b, 2015a, b, 2017, 2018; Larson *et al.,* 2014; Hoese *et al*., 2015; Keith and Hadiaty, 2014; Delrieu-Trottin *et al*., 2020; Sholihah *et al*., 2020, etc.).

The purpose of this paper is to review *Giuris* species found in Indonesia, using genetic and morphomeristic approaches.

METHODS

DNA Barcode analysis

Material examined

A total of 62 *Giuris* specimens were used for this analysis (see table I).

DNA extraction and amplification

Pectoral fin tissue was used to extract total genomic DNA from the 62 individuals using the Macherey & Nagel NucleoSpin® Tissue kits following the manufacturer's instructions on an Eppendorf EpMotion 5075.

The DNA barcode fragment of the *cytochrome oxydase* I (*COI*) mitochondrial gene was amplified using primers FishF1-5'TCAACCAACCACAAAGACATTGGCAC3' and FishR1-5'ACTTCAGGGTGACCGAAGAATCAGAA3' (Ward *et al*., 2005). All PCRs were performed on Biometra thermocyclers in a 25 µl volume of 5% of DMSO, 5 µg of bovine serum albumin, 300 µM of each dNTP, 0.3 µM of Taq DNA polymerase from Qiagen, 2.5 µl of the corresponding buffer, and 1.7 pM of each of the two primers. After a 2-minute denaturation at 94°C, the PCR ran 50 cycles of 25 seconds at 94°C, 25 seconds at 52°C and 1 minute at 72°C, with a 3-minute terminal elongation. Purification and Sanger sequencing of PCR products were performed by Eurofins (http://www.eurofins.fr) using the same forward and reverse PCR primers. Chromatograms were assembled and edited using Geneious 8.1.5. All the sequences were aligned with MAFFT Alignment (implemented in Geneious). The percentage of identity between sequences was calculated on Geneious 8.1.5. The translation into amino acids was checked for the partial fragment of *COI* gene, using the vertebrate mitochondrial genetic code. After translation, one or two bases were discarded at the beginning and the end of the sequences and as a result all the sequences in the alignment started and ended with a codon. All the sequences have been deposited in the barcode of life data system (www.boldsystems.org*;* projects BIFB and BIFFA) as well as GenBank (accession numbers accessible through BOLD).

Phylogenetic relationships were inferred using the Maximum Likelihood (ML) algorithm as implemented in phyml 3.0.1 (Guindon and Gascuel, 2003). The optimization of the ML tree topology was conducted using the BEST tree rearrangement option combining both Nearest-Neighbour Interchange (NNI) and Subtree Pruning and Regrafting (SPR). The best-fit ML substitution model was selected among 88 models according to the Bayesian Information Criterion (BIC) as implemented in jModelTest 2.1.7 (Darriba *et al*., 2012). The statistical support of the tree topology was estimated through 2000 replicates of non-parametric bootstrapping (BP) as implemented in phyml 3.0.1. Delineation of mitochondrial lineages with independent evolutionary dynamics was performed using the Refined Single Linkage (RESL) algorithm as implemented in BOLD and each cluster of sequence was assigned to a Barcode Index Number (BIN) in BOLD (Ratnasingham and Hebert, 2013).

Morphomeristics

All counts and measurements were taken from the left side of specimens. Measurements were taken with dial callipers and are expressed to the nearest tenth of a millimetre. Teeth were consistently counted to the right of the symphysis.

The size is given in standard length (SL). Abbreviation are as follow: P, Pectoral rays; D, Dorsal rays (D1, first dorsal fin; D2, second dorsal fin); A, Anal rays; D1D2, Distance between the posterior part of the base of D1 and the anterior part of the base of D2 (% SL); PDL, Predorsal length (% SL); PAL, Preanal length (% SL); HL, Head length (% SL); JL, jaw length (% SL); CPL, Caudal peduncle length (% SL); CPM, Caudal peduncle height (% SL); Pect-L, Pectoral fin length (% SL); BDa, Body depth at anus (% SL); BDD1, Body depth at first dorsal fin (% SL); SDFL, Second dorsal fin length (% SL); AFL, Anal fin length (% SL); CFL, Cau-

Table I. – Specimens used for the DNA barcode analysis (names, sequences and Barcode Index Numbers).

Tag numbers	Species	BIN	Country	Island	Exact Site	Lat.	Long.	Collectors
IRD BIF3871.2	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Kali Sidutan	–8.2447	116.29	Hubert *et al*.
IRD BIF4040.2	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Kali Sidutan	–8.26951	116.238	Hubert *et al*.
IRD BIF3793.2	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Sidutan	–8.26977	116.238	Hubert *et al*.
IRD BIF3790.2	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Sidutan	–8.26977	116.238	Hubert *et al*.
IRD BIF3987.2	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Kali Pudak	–8.7666	116.946	Hubert *et al*.
BIF10310	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Sulawesi	Ampana	–1.2017	121.227	Hubert *et al*.
BIF2962	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Bali	Tukad Balian	–8.49837	114.967	Hubert *et al*.
IRD BIF3791.2	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Sidutan	–8.26977	116.238	Hubert *et al*.
BIF2283	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Bali	Nbang	–8.385	114.752	Hubert *et al*.
BIF10682	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Sulawesi	Luwuk	–0.866244	123.019	Hubert *et al*.
BIF3947	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Kali muntur	–8.22769	116.431	Hubert *et al*.
BIF2757	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Bali	Tukad Unda	–8.56049	115.423	Hubert *et al*.
BIF2756	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Bali	Tukad Unda	–8.56049	115.423	Hubert *et al*.
BIF10294	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Sulawesi	Ampana	–1.2017	121.227	Hubert *et al*.
BIF10292	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Sulawesi	Ampana	–1.2017	121.227	Hubert *et al*.
BIF10288	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Sulawesi	Ampana	–1.2017	121.227	Hubert *et al*.
BIF10286	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Sulawesi	Ampana	–1.2017	121.227	Hubert *et al*.
BIF2851	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Bali	Tukad Unda	–8.56049	115.423	Hubert *et al*.
BIF2850	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Bali	Tukad Unda	–8.56049	115.423	Hubert *et al*.
BIF2849	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Bali	Tukad Unda	–8.56049	115.423	Hubert *et al*.
BIF2848	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Bali	Tukad Unda	–8.56049	115.423	Hubert *et al*.
BIF2847	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Bali	Tukad Unda	–8.56049	115.423	Hubert *et al*.
BIF2846	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Bali	Tukad Unda	–8.56049	115.423	Hubert *et al*.
IRD BIF3789.2	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Sidutan	–8.26977	116.238	Hubert *et al*.
IRD BIF3946.2	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Kali Muntur	–8.26581	116.425	Hubert *et al*.
IRD BIF4041.2	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Kali Sidutan	–8.26951	116.238	Hubert *et al*.
IRD BIF3870.2	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Kali Sidutan	–8.2447	116.29	Hubert *et al*.
IRD BIF4042.2	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Kali Sidutan	–8.26951	116.238	Hubert *et al*.
IRD BIF3986.2	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Kali Pudak	–8.7666	116.946	Hubert *et al*.
IRD BIF3945.2	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Kali Muntur	–8.26581	116.425	Hubert *et al*.
IRD BIF3978.2	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Kali Eatpace	–8.80292	116.052	Hubert *et al*.
IRD BIF3792.2	*Giuris tolsoni*	BOLD:AAV6427	Indonesia	Lombok	Sidutan	–8.26977	116.238	Hubert *et al*.
IRD BIF5303.2	*Giuris viator* n. sp.	BOLD:ACP9929	Indonesia	Seram	Wai Sia	–3.43486	128.536	Hubert *et al*.
IRD BIF5420.2	*Giuris viator*	BOLD:ACP9929	Indonesia	Seram	Wai Sia	–3.43487	128.537	Hubert *et al*.
BIF5419	*Giuris viator*	BOLD:ACP9929	Indonesia	Seram	Wai Sia	–3.43486	128.536	Hubert *et al*.
BIF2148	*Giuris viator*	BOLD:ACP9929	Indonesia	Java	Mujur	–8.273	113.174	Hubert *et al*.
BIF10734	*Giuris viator*	BOLD:ACP9929	Indonesia	Sulawesi	Luwuk	–0.866244	123.019	Hubert *et al*.
BIF1558	*Giuris viator*	BOLD:ACP9929	Indonesia	Java	Cikareo	–6.81694	105.868	Hubert *et al*.
BIF10732	*Giuris viator*	BOLD:ACP9929	Indonesia	Sulawesi	Luwuk	–0.866244	123.019	Hubert *et al*.
IRD BIF3948.2	*Giuris viator*	BOLD:ACP9929	Indonesia	Lombok	Kali Muntur	–8.26581	116.425	Hubert *et al*.
IRD BIF5302.2	*Giuris viator*	BOLD:ACP9929	Indonesia	Seram	Wai Sia	–3.43486	128.536	Hubert *et al*.
BIF5422	*Giuris viator*	BOLD:ACP9929	Indonesia	Seram	Wai Sia	–3.43486	128.536	Hubert *et al*.
IRD BIF3988.2	*Giuris viator*	BOLD:ACP9929	Indonesia	Lombok	Kali Pudak	–8.7666	116.946	Hubert *et al*.
IRD BIF5329.2	*Giuris viator*	BOLD:ACP9929	Indonesia	Seram	Wai Hetu	–3.4363	128.529	Hubert *et al*.
IRD BIF5421.2	*Giuris viator*	BOLD:ACP9929	Indonesia	Seram	Wai Sia	–3.43488	128.537	Hubert *et al*.
BIF1555	*Giuris viator*	BOLD:ACP9929	Indonesia	Java	Cikareo	–6.81694	105.868	Hubert *et al*.
IRD BIF5423.2	*Giuris viator*	BOLD:ACP9929	Indonesia	Seram	Wai Sia	–3.4349	128.537	Hubert *et al*.
IRD BIF5328.2	*Giuris viator*	BOLD:ACP9929	Indonesia	Seram	Wai Hetu	–3.4363	128.529	Hubert *et al*.
IRD BIF5558.2	*Giuris viator*	BOLD:ACP9929	Indonesia	Ambon	Wai Kalauli	–3.59602	128.058	Hubert *et al*.
BIF10287	*Giuris margaritaceus*	BOLD:ADM7170	Indonesia	Sulawesi	Ampana	–1.2017	121.227	Hubert *et al*.
BIF10692	*Giuris margaritaceus*	BOLD:ADM7170	Indonesia	Sulawesi	Luwuk	–0.866244	123.019	Hubert *et al*.
BIF10695	*Giuris margaritaceus*	BOLD:ADM7170	Indonesia	Sulawesi	Luwuk	–0.866244	123.019	Hubert *et al*.

Table I. – Continued.

Tag numbers	Species	BIN	Country	Island	Exact Site	Lat.	Long.	Collectors
BIF10296	*Giuris margaritaceus*	BOLD:ADM7170	Indonesia	Sulawesi	Ampana	–1.2017	121.227	Hubert *et al.*
BIF10293	*Giuris margaritaceus*	BOLD:ADM7170	Indonesia	Sulawesi	Ampana	–1.2017	121.227	Hubert *et al.*
IRD BIF5241.2	*Giuris margaritaceus*	BOLD:ADM7170	Indonesia	Ambon	Waai Tasoi River	–3.57027	128.319	Hubert *et al.*
IRD BIF5237.2	*Giuris margaritaceus*	BOLD:ADM7170	Indonesia	Ambon	Waai Tasoi River	–3.57027	128.319	Hubert *et al.*
IRD BIF5240.2	*Giuris margaritaceus*	BOLD:ADM7170	Indonesia	Ambon	Waai Tasoi River	–3.57027	128.319	Hubert *et al.*
BIF10733	*Giuris margaritaceus*	BOLD:ADM7171	Indonesia	Sulawesi	Luwuk	–0.866244	123.019	Hubert *et al.*
BIF10303	*Giuris margaritaceus*	BOLD:ADM7171	Indonesia	Sulawesi	Ampana	–1.2017	121.227	Hubert *et al.*
BIF10289	*Giuris margaritaceus*	BOLD:ADM7171	Indonesia	Sulawesi	Ampana	–1.2017	121.227	Hubert *et al.*
IRD BIF5238.2	*Giuris margaritaceus*	BOLD:ADM7171	Indonesia	Ambon	Waai Tasoi River	–3.57027	128.319	Hubert *et al.*
IRD BIF5331.2	*Giuris margaritaceus*	BOLD:ADM7171	Indonesia	Seram	Wai Hetu	–3.4363	128.529	Hubert *et al.*

dal fin length (% SL); O, Eye diameter (% SL); IO, Interorbital length (% SL); SL, Standard length (SL) (mm).

For scales, abbreviation are as follow: LS, scales in lateral series counted from upper pectora1 base, or anteriormost scale along lateral midline, to central hypural base; PD, predorsal midline counted from scale directly anterior to first dorsal fin insertion to the anteriormost scale; TRB, transverse series back, refers to scales counted from the first scale anterior to second dorsal fin, in a diagonal manner, posteriorly and ventrally to the anal fin base or ventralmost scale; TRF, transverse series forward refers to scales counted from the first scale anterior to second dorsal fin, in a diagonal manner, anteriorly and ventrally to the centre of belly or ventralmost scale; ZZ, zigzag series, refers to scales on the narrowest region of the caudal peduncle counted from the dorsalmost scale to the ventralmost scale in a zigzag (alternating) manner; ENO, number of scales around the eye, counted between the nostrils and the inferior posterior margin of the eye.

Abbreviations for the cephalic sensory pore system follow Akihito (1986). There are no oculoscapular canal and supratemporals. There is a short preopercular canal with the pores N' and O'.

The head sensory papillae of *Giuris* are described by Akihito *et al.* (1988) as follow: a line of pit organs from near tip of snout to above posterior margin of operculum with an interruption above upper pore on operculum; a transverse line upwards above the longitudinal line, both sides not connected; a transverse line below the longitudinal going between anterior and posterior nostrils downwards to upper jaw; a line from posterior end of eye foregoing downwards to upper jaw, 2 longitudinal lines on cheek; a transverse line from upper pore on operculum; a line from lower pore on preoperculum extending on lower jaw; a cluster of pit organs behind symphysis of lower jaw; a transverse line with a longitudinal branch on operculum, and an oblique line on posterior part of operculum.

Material examined

Specimens were compared to type specimens from Museum collections (MNHN: Muséum national d'Histoire naturelle, Paris; RMNH: Rijksmuseum van Natuurlijke Historie, Leiden; ANSP: The Academy of Natural Sciences of Drexel University, formerly the Academy of Natural Sciences of Philadelphia; AMS: Australian Museum of Sydney).

Eleotris margaritacea Valenciennes *in* Cuvier & Valenciennes, 1837. Holotype: MNHN A-1575. Vanikoro Island, Santa Cruz Islands, southwestern Pacific.

Eleotris (Giuris) laglaizei Sauvage, 1880. Holotype: MNHN A-1690. Manila, Philippines.

Eleotris (Giuris) vanicolensis Sauvage, 1880. Holotype: MNHN A-1675. Vanikoro Island, Santa Cruz Islands, southwestern Pacific.

Eleotris aporos Bleeker, 1854. Syntypes: (4) RMNH 5178 (2 of 6). Sindangole; Halmahera (not Ternate), Moluccas, Indonesia.

Lairdina hopletupus Fowler, 1953. Holotype: ANSP 71968 (Xrays). Paratypes: ANSP 71969 (1). Singatoka, South Viti Levu, Fiji Islands.

Eleotris tolsoni Bleeker, 1854. Holotype: RMNH 5180 (1 of 17). Near Djunkulon, extreme western Java, Indonesia.

Eleotris hoedtii Bleeker, 1854. Holotype: RMNH 5180 (largest of 17). Ambon Island, Indonesia.

Eleotris aporocephalus, Macleay, 1884. Syntype: AMS A.17837 Lillesmere Lagoon, Burdekin River, Queensland, Australia.

Ophiocara aporos rigonis, Whitley, 1938. Holotype: AMS IA.5785. Paratypes: AMS IA.5787, IA.5789. Freshwater creek near Rigo, Papua New Guinea.

Ophiocara aporos guentheri, Koumans, 1937. Holotype: RMNH 11422. Palau Islands, western Pacific.

RESULTS

Morphomeristics

After type specimen examination and measurements, the morphological and meristic identification of the specimens showed that three species were represented in our samples; two of them have been already described: *Giuris margari-*

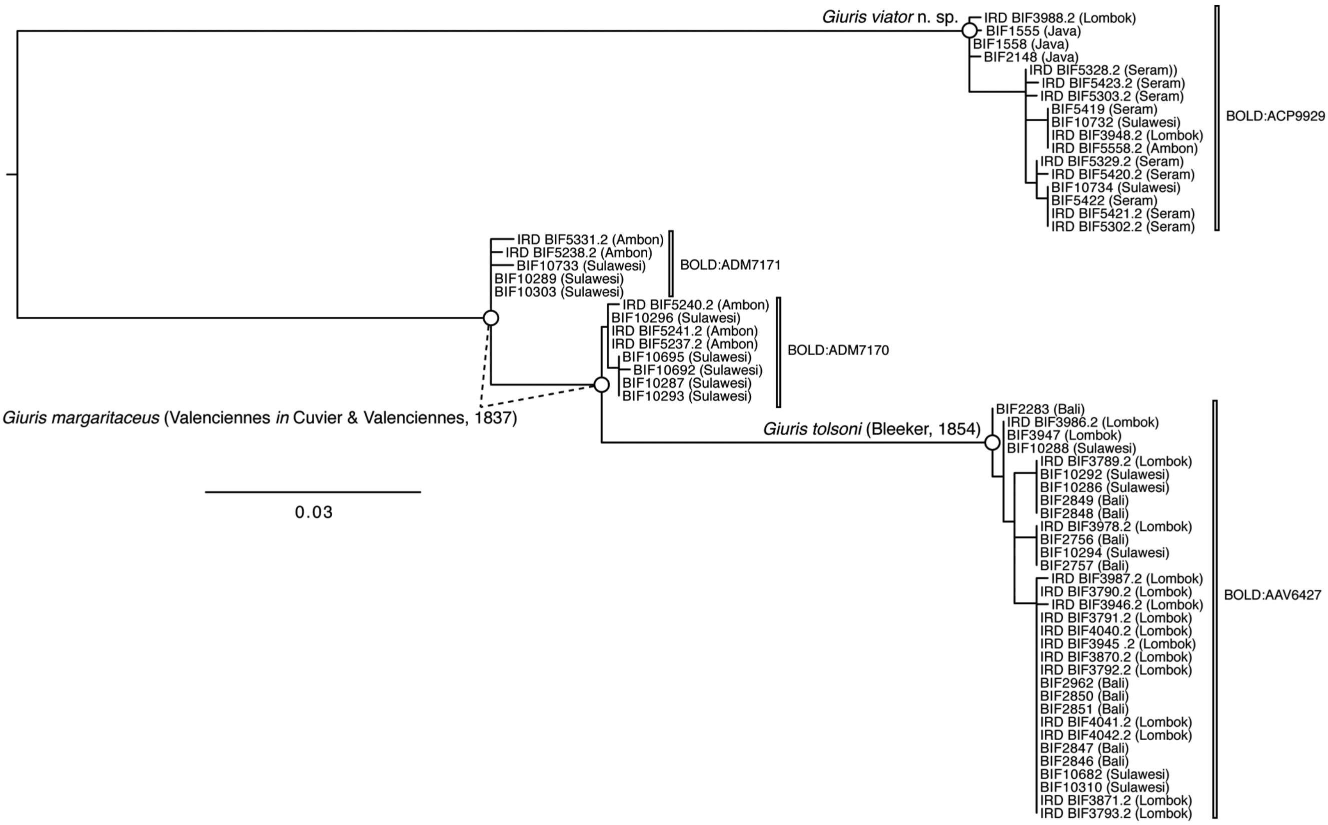

Figure 1. – Most likely ML tree inferred using the K80+I model (–lnL = 1548.01608, Transition/tranversion ratio = 20.137, I = 0.776). Barcode Index Numbers (BIN) are given for each lineages.

taceus (Valenciennes, 1837) widespread in the Indo-Pacific and *Giuris tolsoni* (Bleeker, 1854) [which is not a synonym of *G. margaritaceus* as stated by Fricke *et al.* (2020)] from Philippines and Taiwan to Indonesia. One is new to science: *Giuris viator* n. sp. (present paper) widespread in the Pacific. Its description is given thereafter, as are the re-descriptions of the two other known species.

DNA Barcode analysis

A total of 652 base pairs were amplified for the COI gene. The most likely substitution model selected by jmodeltest was K80+I. The ML tree (Fig. 1) allowed delimiting four molecular lineages within the three species, each corresponding to a distinct mitochondrial lineage as evidenced by the RESL algorithm excepting for *G. margaritaceus* (Tab. I). (BOLD:ACP9929, BOLD:ADM7170, BOLD:ADM7171, BOLD:AAV6427). The K80+I genetic distance among the three species examined here is high ranging from 0.0556 between *G. tolsoni* and *G. margaritaceus* to 0.2706 between *G. tolsoni* and *G. viator*. By contrast, the K80+I genetic distance ranged from 0 to 0.0125 within molecular lineages and 0 to 0.0226 within species.

***Redescription of* Giuris margaritaceus**

***Giuris margaritaceus* (Valenciennes, 1837)**
(Figs 1-2; Tabs II-III)

Eleotris aporos Bleeker, 1854
Eleotris hoedtii Bleeker, 1854
Ophiocara aporos guentheri, Koumans, 1937
Eleotris (Giuris) vanicolensis Sauvage, 1880

NB. – Kottelat (2013) considered that the rejection of *E. margaritacea* by Akihito and Meguro (1974) was not possible; he thus considered that it is the oldest available and valid name for the present species.

Material examined

Holotype. – MNHN A-1575, Vanikoro Island, Santa Cruz Islands, southwestern Pacific.

Others. – *Eleotris aporos* Bleeker, 1854: Syntypes: (4) RMNH 5178 (2 of 6). Sindangole; Halmahera (not Ternate), Moluccas, Indonesia. – *Eleotris hoedtii* Bleeker, 1854. Holotype: RMNH 5180 (largest of 17). Ambon Island, Moluccas, Indonesia. – *Ophiocara aporos guentheri*, Koumans, 1937. Holotype: RMNH 11422. Palau Islands, western Pacific. – *Eleotris (Giuris) vanicolensis* Sauvage, 1880. Holotype:

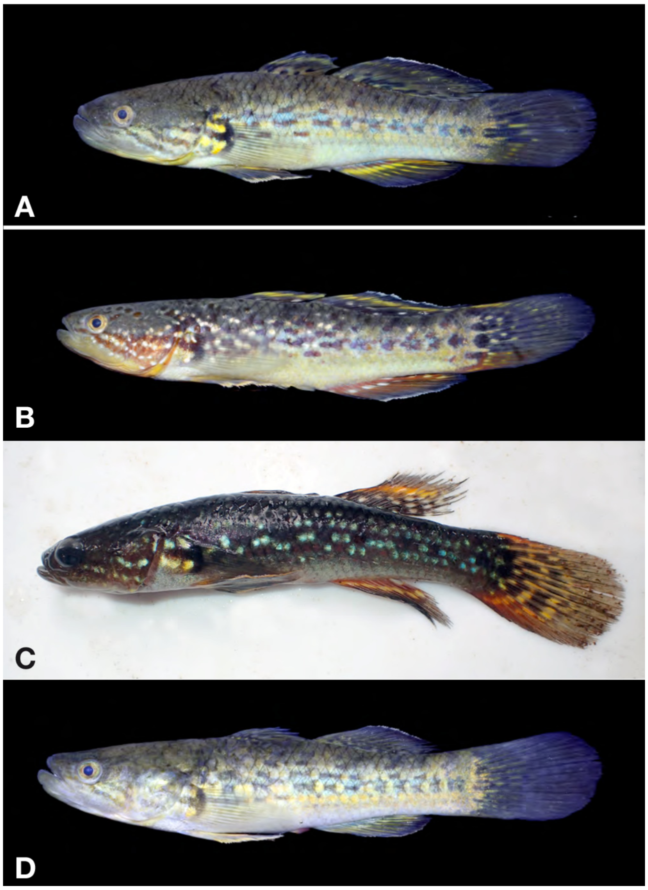

Figure 2. – **A**: *Giuris margaritaceus, in* MZB.25326, male; Moluccas, Ambon; BIF 5237; SL 120 mm (Photo N. Hubert). **B**: *G. margaritaceus, in* MZB.25326, male; Moluccas, Ambon; BIF 5235; SL 136 mm (Photo N. Hubert). **C**: *G. margaritaceus,* MNHN 2020-0135, male; New Britain, Papua New Guinea (Photo P. Keith). **D**: *G. margaritaceus, in* MZB.25326, female; Moluccas, Ambon; BIF 5238; SL 114 mm (Photo N. Hubert).

MNHN A-1675. Vanikoro Island, Santa Cruz Islands, southwestern Pacific.

MZB.25326, Moluccas, Ambon, Waai Tasoi River, 26 Mar. 2016, Hubert *et al*. coll.; BIF 5235, BIF 5237, BIF 5238, BIF 5240, BIF 5241. – MZB.25327, Moluccas, Halmahera, Saluta, Sungai Kam, 25 Mar. 2017, Hubert *et al.* coll.; BIF 6869. – MNHN 2019-0239 (tag 17729), Water Lily Hole, Nut, West New Britain, Papua New Guinea, 23 Oct. 2018, Keith *et al*. coll. – MNHN 2015-0358 (4 spms), Pisuku, Choiseul Island, Solomon, 10 Oct. 2014, Keith *et al*. coll. – MNHN 2015-0359 (2 spms), Lokasereke, Choiseul Island, Solomon, 13 Oct. 2014, Keith *et al*. coll. MNHN 2016-0224, Kolobangara Island, Solomon, 11 Nov. 2015, Keith *et al*. coll. – MNHN 2016-0229, Kolobangara Island, Solomon, 9 Nov. 2015, Keith *et al*. coll. MNHN 2019-0249 (tags 17687 & 17688), Ore, West New Britain, Papua New Guinea, 25 Oct. 2018, Keith *et al*. coll.

Description

The scale and ray counts are given in table II and morphomeristic data in table III.

The body is more ovoid than elongated. The body depth at anus is 20-24 (% SL), at first dorsal fin 20-25 (% SL), and the caudal peduncle depth is 13-16 (% SL). Predorsal length 43-49 (% SL) and preanal length 59-66 (% SL). Size: up to 18 cm SL.

The head (30-35% SL) is depressed, the snout is convex. The anterior nostrils are short, not reaching upper margin of upper lip. The mouth and the jaw length (10-11% SL) are small. Inwardly curved teeth set on both jaws and larger on outer row. Posterior end of maxillary extending to nearly below anterior margin of eye. Lips with internal short and sometimes bifid papillae. Generally no external papillae on mentum, snout, inferior lip and between nostrils. Eye diameter 6-8 (% SL) and interorbital length 12-14 (% SL).

Dorsal fins VI-I,8 without filamentous rays. The first dorsal fin is with second, third and fourth rays longer. Anal fin I,9 directly opposite to the second dorsal fin. The caudal fin is with 13-14 branched rays and its posterior margin is rounded. Pelvic fins separate, I,5. Pectoral fins 14-15, with the posterior margin rounded. Lateral scales 28-31, with ctenoid scales on flanks and caudal peduncle. Cycloid scales from snout to top of head and anterior part of D1, on operculum, on base of pectoral fins and on belly extending to anus. Scales on top of head and back bigger than those on belly. Scales in transverse back series 9-10, in transverse forward 13-14, in predorsal 15-17 and in zigzag 9-10. 8-11 scales around the eye (ENO). 25 vertebrae.

Absence of oculoscapular canal and supratemporals and presence of a short preopercular canal with pores N' and O'.

Cephalic sensory papillae system developed as described by Akihito *et al*. (1988).

Males with a rounded/triangular urogenital papilla with distal tip rounded. Females have a bulbous urogenital papilla with fimbriate projections around distal opening.

Colour in preservation

For the most common pattern, male and female similar. Background of body brownish to beige on the back and on the flanks. Lateral part of head brownish with 3 stripes radiating from the eye to the cheeks and operculum, the upper one continuing on the pectoral base. The belly is whitish to greyish. Nine to eleven large alternating dark patches along the flanks from pectoral base to hypural base. Base of caudal fin with 3 brown spots. The first dorsal fin is greyish. The second dorsal fin is greyish with a white stripe at the distal tip. Pectoral, pelvic, anal and caudal fins greyish.

Colour in life

Males. – (Fig. 2) More colourful than females. General pattern variable and three main were observed: (1) The most

Table II. – Main ray and scale counts for *Giuris* species

	Pectoral rays		Caudal rays			Lateral scales					Predorsal series				Transverse backward series			
	14	15	13	14	15	28	29	30	31	32	14	15	16	17	9	10	11	12
G. viator n. sp.	11		3	7		2	3	2	2	1	2	2	6			6	3	1
G. tolsoni	11		5	4	1		5	3	3		1	5	5			6	5	
G. margaritaceus	6	6	7	3	1	3	5	3	1			6	3	3	3	9		

	Transverse backward series				Transverse forward series				Zigzag series			ENO							
	9	10	11	12	13	14	15	16	8	9	10	6	7	8	9	10	11	12	13
G. viator n. sp.		6	3	1		5	5			5	5					3	4	1	2
G. tolsoni		6	5		4	4	2	1	1	9	1	2	4	4	1				
G. margaritaceus	3	9			6	6				10	2			3	3	4	2		

Table III. – Main morphomeristic data for *Giuris* species expressed to the nearest whole percent of standard length.

	Eye diameter			Interorbital length						Jaw length			
	6	7	8	9	10	11	12	13	14	9	10	11	12
G. viator n. sp.	3	4	3		1	3	2	3	1		6	3	1
G. tolsoni	3	8		1	3	5	2			2	2	4	3
G. margaritaceus	7	4	1				5	5	2		8	4	

	Caudal peduncle depth				Body depth at first dorsal fin origin					
	13	14	15	16	20	21	22	23	24	25
G. viator n. sp.		3	7		3	2	–	2	3	
G. tolsoni	4	5	2		6	–	2	1	2	
G. margaritaceus	1	5	5	1	1	2	3	4	–	2

	Body depth at anus origin									Preanal length									
	16	17	18	19	20	21	22	23	24	59	60	61	62	63	64	65	66	67	68
G. viator n. sp.						5	1	1	3	1	–	2	–	2	3	1	1		
G. tolsoni	1	1	1	1	3	1	3			1	2	–	–	1	2	2	–	2	1
G. margaritaceus					1	2	4	3	2	1	1	4	1	2	–	2	1		

common male pattern found (Fig. 2A) corresponds to males with background of body brownish to beige on the back to bright yellow or beige on the flanks. Top of head light brown, with sometimes several reddish dots, lateral part light brown with 3 red stripes radiating from the eye to the cheeks and operculum, the two upper ones continuing on the pectoral base. The belly is whitish to greyish. Nine to fourteen large alternating reddish to bluish rounded patches along the flanks from pectoral base to hypural base. These patches are underlined by a more or less discontinuous red line. Base of caudal fin with 3 red spots. The first dorsal fin is translucent with about 4 dark spots at the base. The second dorsal fin is slightly greyish with dark spots at the base and a white stripe at the distal tip. Pectoral fins hyaline. Pelvic fins translucent with a bright yellow stripe at the base and a white stripe at the distal part. Anal fin translucent in its distal half and with a large yellow band in its inner half. Caudal fin hyaline. (2) The second type of male pattern found (Fig. 2B) corresponds to males with background of body entirely reddish and covered with numerous silver spots including at the base of the two dorsal, the anal and the caudal fins. Three red stripes and three spotted blue rows radiating from the eye to the cheeks and operculum, the upper red one continuing on the pectoral base. The belly is whitish to yellowish. The two dorsal fins have a central bright yellow stripe. Second dorsal fin with a white stripe in its distal part. The anal fin is reddish. The caudal fin has a bright red basal part, has a yellow tinge in the dorsal and ventral parts of the caudal peduncle as well as on the rest of the fin. (3) The rarest pattern male (Fig. 2C) corresponds to males with background of body entirely dark brown and with sinuous longitudinal line of small sliver to bluish spots. Two spotted blue rows radiating from the eye to the cheeks and operculum, the upper one continuing on the pectoral base and along midline. The belly is whitish to greyish. The anal and dorsal fins are red-brown at the base, with silver spots and surmounted by an orange band. The caudal fin is red-brown and orange spotted with a red basal part.

Females. – (Fig. 2D) Background of body brownish to greyish on the back. Top of head brownish, lateral part yellowish with 3 slight red stripes radiating from the eye to the cheeks and operculum, the upper one continuing on the pectoral base. Nine to eleven small alternating reddish to bluish rounded patches along the flanks from pectoral base to hypural base. Belly whitish as lower part of flanks. The first dorsal fin is translucent. The second dorsal fin is slightly greyish with a thin white stripe at the distal tip. Pectoral fins hyaline. Pelvic fins hyaline. The anal fin hyaline with a light yellow base. Caudal fin hyaline.

Ecology

Giuris margaritaceus occurs in estuaries, lower parts of coastal streams and ponds, usually in riverbank vegetation and in shelters over rocky or gravel bottoms. It is mostly carnivorous and feeds on small crustaceans, insects and fish. It is thought to be amphidromous as some other species of the family (Keith *et al*., 2010). In Indonesia, it is sometimes found in sympatry with *Giuris viator* n. sp. (present paper) or *Giuris tolsoni*.

Distribution

Giuris margaritacea is known from Indonesia (Ambon, Ceram, Halmahera, Sulawesi), Philippines, Palau, Salomon, Gaua (Vanuatu), and Papua New Guinea.

Comparison

Giuris margaritaceus differs from the other species sequenced and present in the area by displaying distinct mitochondrial lineages from its closest relatives and high K80+I genetic distances to its relatives at COI gene (0.0556 to its closest relative *G. tolsoni*). Moreover, it differs from *Giuris tolsoni* in having more scales around the eye (8-11 *vs*. 6-9), a greater interorbital length (12-14 *vs*. 9-12), 14 or 15 pectorals rays *vs*. always 14 and by the different male colourful patterns. It differs from *Giuris* viator n. sp. (present paper) in having 14 or 15 pectorals rays *vs*. always 14, fewer scales in backward series (9-10 *vs*. 10-12) and by the different male colourful patterns.

Redescription of Giuris tolsoni

Giuris tolsoni (Bleeker, 1854)
(Figs 1, 3; Tabs II-III)

Material examined

Holotype. – RMNH 5180 (1 of 17), Near Djung-Kulon (Djunkulon), extreme western Java, Indonesia.

Others. – MZB.25328, Bali, West Bali, Kab Jembrana, Nbang, 15 Apr. 2014, Hubert *et al*. coll.; BIF 2283. – MZB.25329, Bali, West Bali, Kab Kelungkung, Tukad Unda, 22 Apr. 2014, Hubert *et al*. coll.; BIF 2846 to BIF 2850. – MZB.25330, 24 Apr. 2014, Bali, West Bali, Kab Tabanan, Tukad Balian, Hubert *et al*. coll.; BIF 2962. – MZB.25331, Lombok, Lombok Utara, Kali Sidutan, 2 Apr. 2015, Hubert *et al*. coll.; BIF 4040. – MZB.25332, Lombok, Lombok Utara, Sidutan, 28 March 2015, Hubert *et al*. coll.; BIF 3790 & BIF 3792.

Description

The scale and ray counts are given in table II and morphomeristic data in table III.

The body is more ovoid than elongated. The body depth at anus is 16-22 (% SL), at first dorsal fin 20-24 (% SL), and the caudal peduncle depth is 13-15 (% SL). Predorsal length 39-47 (% SL) and preanal length 59-68 (% SL). Size: up to 11 cm SL.

The head (31-37% SL) is depressed, the snout is convex. The anterior nostrils are short, not reaching upper margin of upper lip. Mouth and jaw length (9-12% SL) small. Inwardly curved teeth set on both jaws and larger on outer row. Posterior end of maxillary extending to below around anterior margin of eye. Lips with numerous internal short papil-

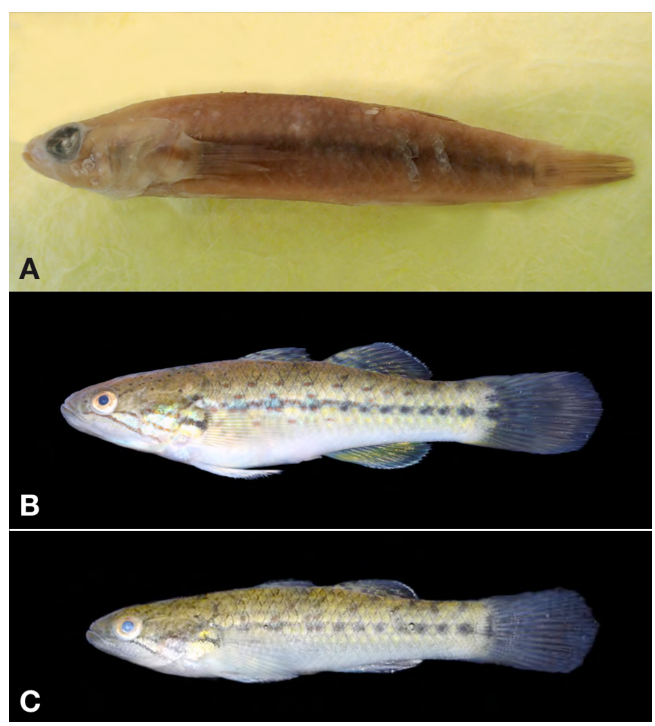

Figure 3. – **A**: *Giuris tolsoni*, RMNH 5180, holotype, male; SL 61.5 mm (Photo RMNH, P. Keith). **B**: *G. tolsoni*, MZB.25328, male, Bali; BIF 2283; SL 66 mm (Photo N. Hubert). **C**: *G. tolsoni, in* MZB.25329, female, Bali; BIF 2848; SL 34 mm (Photo N. Hubert).

lae, large and bifid in several specimens. Eye diameter 6-7 (% SL), and interorbital length small (9-12% SL).

Dorsal fins VI-I,8 without filamentous rays. The first dorsal fin is with second, third and fourth rays longer. Anal fin I,9 directly opposite to the second dorsal fin. The caudal fin is with 13-15 branched rays and its posterior margin is rounded. Pelvic fins separate, I,5. Pectoral fins 14, with the posterior margin rounded. Lateral scales 29-31, with ctenoid scales on flanks and caudal peduncle. Cycloid scales from snout to top of head and anterior part of D1, on operculum, on base of pectoral fins and on belly extending to anus. Scales of top of head and back greater than those of belly. Scales in transverse back series 10-11, in transverse forward 13-16, in predorsal 14-16 and in zigzag 8-10. 6-9 scales around the eye. 25 vertebrae.

Absence of oculoscapular canal and supratemporals and presence of a short preopercular canal with pores N' and O'.

Cephalic sensory papillae system developed as described by Akihito *et al*. (1988).

Males with a rounded/triangular urogenital papilla with distal tip rounded. Females have a bulbous urogenital papilla with fimbriate projections around distal opening.

Colour in preservation (Fig. 3A)

Male and female similar. Background of body and head brown to beige. Lateral part brownish with, for several specimens, 1-3 brown stripes radiating from the eye to the cheeks and operculum and four to five longitudinal parallel rows of aligned small brownish dots, or a dark longitudinal and medium brown band from pectoral to hypural base. The fins are greyish to beige.

Colour in life

Males (Fig. 3B). – Male with background of body light brown on the back to bright beige and yellow on the flanks. Belly white. Top of head brownish, with several small reddish dots, lateral part greyish to bluish with 3 thin red stripes radiating from the eye to the cheeks and operculum, the first or two highest continuing on the pectoral base. Four to five longitudinal parallel rows of aligned small red dots, alternating with blue and yellow parts. Sometimes the medium row forms a continuous line from pectoral base to hypural base. The first dorsal fin is translucent with yellow stripes in the medium part. The second dorsal and anal fins are yellowish at the base and hyaline at the distal half with a thin white stripe at the distal tip. Pectoral, pelvic and caudal fins hyaline.

Females (Fig. 3C). – background of body light brown on the back to bright beige on the flanks. Top of head brownish, lateral part greyish to bluish with 3 thin red stripes radiating from the eye to the cheeks and operculum, the first or two highest continuing on the pectoral base. Small alternating reddish to bluish rounded patches along the flanks from pectoral base to hypural base, forming a medium straight or sinuous band. Belly whitish as the lower part of the flanks. The first dorsal fin is translucent. The second dorsal fin is slightly greyish with a thin white stripe at the distal tip. Pectoral fins hyaline. Pelvic fins hyaline with a white distal margin. The anal fin is yellow or grey with a distal white stripe. Caudal fin hyaline.

Ecology

Giuris tolsoni occurs in estuaries and lower parts of coastal streams, usually in riverbank vegetation. It is mostly carnivorous and feeds on small shrimps, insects and fish. It is thought to be amphidromous. In Indonesia it is sometimes found in sympatry with *G. margaritaceus* or *G. viator* n. sp. (present paper).

Distribution

Giuris tolsoni is known from Indonesia (Bali, Lombok, Halmahera, Sulawesi), Philippines Japan and Taiwan.

Comparison

Giuris tolsoni differs from the other species sequenced and present in the area by displaying reciprocal monophyly from its closest relatives and high K80+I genetic distances to its relatives at COI gene (0.0556 to its closest relative *G. margaritaceus*). Moreover, it differs from *Giuris viator* n. sp. (present paper) in having fewer scales around the eye (6-9 *vs*. 10-13), a smaller body depth at anus (16-22 *vs*. 21-24% SL) and by the colourful pattern of the male. It differs from *Giuris margaritaceus,* in having fewer scales around the eye (6-8 *vs*. 8-11), a smaller interorbital length (9-12 *vs*. 12-14% SL), always 14 pectorals rays *vs*. 14 or 15 rays, and by the colourful pattern of the male.

Description of the new species

***Giuris viator* n. sp. Keith, Mennesson, Lord, Hubert**
(Figs 1-4; Tabs II-III)

Material examined

Eleven specimens, totalling 6 males and 5 females; size range 37.3-122 mm SL, largest male 122 mm SL, largest female 79.5 mm SL.

Holotype. – MNHN 2019-0238, male (122 mm SL), Fausse Yaté, 29 Nov. 2018, New Caledonia, Charpin coll.; tag 6844.

Paratypes. – MNHN 2007-0093, female (64.5 mm SL), Peavot, Santo, Vanuatu, 22 Nov. 2006, Keith, Lord, Kalfatak, Gerbeaux *et al*. coll.; tag 12678. – MNHN 2007-0107, male (35.5 mm SL), Santo, Vanuatu, 8 Nov. 2006, Keith, Lord, Kalfatak, Gerbeaux *et al*. coll. – MNHN 2019-0237, male (72.3 mm SL), Kolobangara, Solomon, 18 Nov. 2015, Keith, Lord, Boseto, Marquet *et al*. coll.; tag 06932.

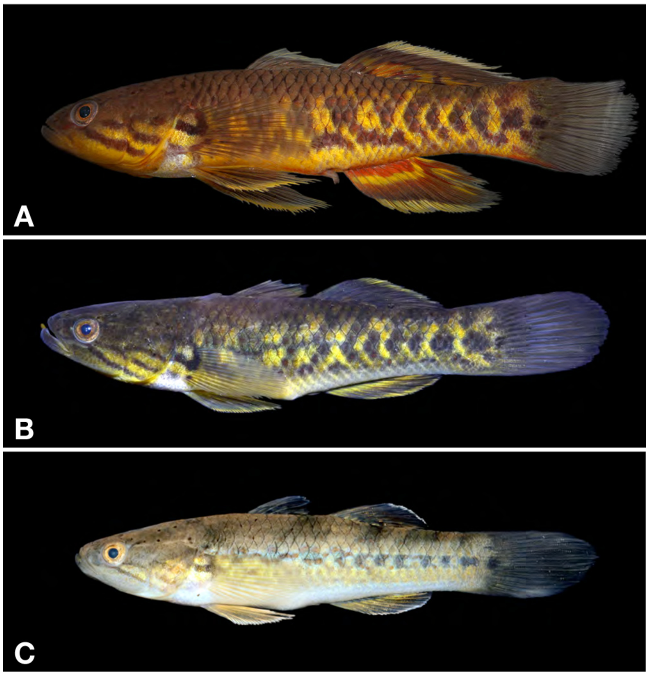

Figure 4. – **A**: *Giuris viator* n. sp., MNHN 2019-0238, holotype, male; SL 122 mm New Caledonia (Photo N. Charpin). **B**: *G. viator* n. sp., MZB.25333, paratype, male; Moluccas, Ceram; BIF 5419; SL 90 mm (Photo N. Hubert). **C**: *G. viator* n. sp., *in* MZB.25337, paratype, female; Halmahera; BIF 6882; SL 79.5 mm (Photo N. Hubert).

– MNHN 2019-0247, female (128.6 mm SL), Kû Bwéné, New Caledonia, 8 Jul. 2019, Charpin coll.; tag 12599. – MZB.25333, male (90 mm SL), Moluccas, Ceram, Ceram Barat, Wai Sia, 1 Apr. 2016, Hubert *et al*. coll.; BIF 5419. – MZB.25334, female (69 mm SL), Moluccas, Ceram, Ceram Barat, Wai Sia, 28 Mar. 2016, Hubert *et al*. coll.; BIF 5302. – MZB.25335, female (49.5 mm SL), Java, Banten, Kab Pandeglang, Cikareo, 9 Dec. 2013, Hubert *et al.;* coll. BIF 1555. – MZB.25336, male (37.3 mm SL), Java, East Java, Kab Lumajang, Mujur, 13 Apr. 2014, Hubert *et al*. coll.; BIF 2148. – MZB.25337, 1 male and 1 female (50-79.5 mm SL), Moluccas, Halmahera, Bibisingo, Kali Aru, 24 Mar. 2017, Hubert *et al.;* coll.; BIF 6882 & BIF 6864.

Diagnosis

The new species has 14 pectorals rays, a medium body depth at anus (21-24% SL), and 10-13 scales around the eye.

Description

The scale and ray counts are given in table II and morphomeristic data in table III.

Below, the holotype counts are given first, followed in brackets, if different, by the paratypes' counts.

The body is more ovoid than elongated. The body depth at anus is 24 (21-24% SL), at first dorsal fin 23 (20-24% SL), and the caudal peduncle depth is 15 (14-15% SL). Predorsal length 44 (42-47% SL) and preanal length 64 (59-66% SL).

The head 33 (31-35% SL) is depressed, the snout is convex. The anterior nostrils are short, not reaching upper margin of upper lip. Mouth and jaw length 11 (10-12% SL) small. Inwardly curved teeth set on both jaws and larger on outer row. Posterior end of maxillary extending to below around anterior margin of eye. Lips with numerous internal short and fine papillae. Several specimens with numerous external papillae on mentum, snout, inferior lip and between nostrils. Eye diameter 6 (6-8% SL) and interorbital length 13 (10-14% SL).

Dorsal fins VI-I,8 with no filamentous rays. The first dorsal fin is with second, third and fourth rays longer. Anal fin I,9 directly opposite to the second dorsal fin. The caudal fin is with 14 (13-14) branched rays and its posterior margin is rounded. Pelvic fins separate, I,5. Pectoral fins 14, with the posterior margin rounded. Lateral Scales 30 (28-32), with ctenoid scales on flanks and caudal peduncle. Cycloid scales from snout to top of head and anterior part of D1, on operculum, on base of pectoral fins and on belly extending to anus. Scales on top of head and back bigger than those on belly. Scales in transverse back series 10 (10-12), in transverse forward 14 (14-15), in predorsal 16 (14-16) and in zigzag 9 (9-10). Scales around the eye 11 (10-13). 25 vertebrae.

Absence of oculoscapular canal and supratemporals and presence of a short preopercular canal with pores N' and O'.

Cephalic sensory papillae system developed as described by Akihito *et al*. (1988).

Males with a rounded/triangular urogenital papilla with distal tip rounded. Females have a bulbous urogenital papilla with fimbriate projections around distal opening.

Colour in preservation

Males. – Background of body brown on the back to greyish on the flanks. Top of head brownish, lateral parts lighter with 3 brown stripes (more or less thick) radiating from the eye to the cheeks and operculum. Eight to ten large alternating brownish rounded patches along the flanks from pectoral base to hypural base. Base of caudal fin with 3-4 brown spots. The first dorsal fin is greyish with black zebra stripes in the medium part. The second dorsal fin is slightly greyish. Pectoral and pelvic fins are light brown. Anal fin greyish. Caudal fin greyish.-

Females. – Background of body brownish on the back. Top of head brownish, lateral parts beige with 3 light brown stripes radiating from the eye to the cheeks and operculum. Eight to ten small alternating brownish rounded patches along the flanks from pectoral base to hypural base. Belly whitish as are the lower parts of the flanks. Base of caudal fin with one large brown spot. The first dorsal fin is greyish. The second dorsal fin is slightly greyish with a thin white stripe at the distal tip. Pectoral and caudal fins greyish. Pelvic and anal fins greyish with a white distal margin.

Colour in life

Males (Fig. 4A, B). – More colourful than females. The general colour pattern is variable depending on the maturity of the individual. Two main patterns: (1) with background of body brown on the back to bright red and yellow on the flanks. Belly yellow. Top of head brown and slightly spotted, lateral part yellow with 3 red stripes (more or less thick) radiating from the eye to the cheeks and operculum, the highest continuing on the pectoral base. Eight to ten large alternating reddish to bluish rounded patches along the flanks from pectoral base to hypural base. These patches are underlined by a more or less continuous red line. Base of caudal fin with 3-4 red spots, preceded by a large red spot on caudal peduncle, all these spots resemble a cat's paw print directed towards the posterior of the fish. The first dorsal fin is translucent with black zebra stripes in the medium part and a large whitish distal stripe. The second dorsal fin is slightly greyish with, on the lower part, yellow and red small spots, on the medium part a large brown band and with a large white stripe at the distal tip. Pectoral fins hyaline. Pelvic fins hyaline with a yellow distal margin. The anal fin is brightly coloured with alternating stripes from the base to distal part: red, yellow red, black and white. Caudal fin hyaline with red to orange lower distal margin (Fig. 4A). (2) with background of body brownish to greyish on the back, yellow on the flanks. Belly whitish to greyish. Top of head brown and lightly spotted. Lower lateral part of the head yellow with 3 reddish-brown stripes radiating from the eye to the cheeks and operculum, the highest continuing on the pectoral base. Eight to ten large alternating reddish-brown rounded patches along the flanks from pectoral base to hypural base. Base of caudal fin with 3-4 brownish spots, preceded by a large reddish-brown spot on caudal peduncle, all these spots resemble a cat's paw print directed towards the posterior of the fish. The first dorsal fin is translucent. The second dorsal fin is translucent with a yellow stripe at the distal border. Pectoral fins hyaline. Pelvic fins hyaline with a yellow distal margin. The anal with alternating stripes from the base to distal part: yellow, black and yellow. Caudal fin hyaline (Fig. 4B).

Females (Fig. 4C). – Background of body brownish on the back. Top of head brownish with a few scattered black spots, lateral part beige-yellowish with 3 light reddish stripes radiating from the eye to the cheeks and operculum, the upper one continuing on the pectoral base. Eight to ten small alternating reddish to bluish rounded patches along the flanks from pectoral base to hypural base. Belly whitish as the lower part of the flanks. Base of caudal fin with one central brown spot. The first dorsal fin is translucent. The second dorsal fin is slightly greyish with a thin white stripe at the distal tip. Pectoral fins hyaline. Pelvic fins yellowish to hyaline with a white distal margin. The anal fin is yellow or grey with a distal white stripe. Caudal fin hyaline.

Ecology

This species occurs in estuaries and lower parts of coastal streams, usually in riverbank vegetation and in shelters over rocky or gravel bottoms. It is mostly carnivorous and feeds on small shrimps, insects and fish. It is thought to be amphidromous as some other species of the family (Marquet *et al*., 2003; Keith *et al*., 2010).

Distribution

This species is widespread and known from Mayotte in Indian Ocean to Indonesia (Java, Lombok, Ceram, Ambon, Halmahera, Sulawesi), Papua New Guinea, Salomon, Vanuatu, and New Caledonia in Pacific Ocean. Depending on the locality, it is sometimes found in sympatry with *G. tolsoni* or *G. margaritaceus*.

Etymology

The name of the species is derived from the latin word *viator*, meaning the traveller, the pilgrim, as the species has a large distribution from Indian Ocean to New Caledonia.

Comparison

Giuris viator n. sp., differs from the other species sequenced and present in the area by displaying reciprocal monophyly from its closest relatives and high K80+I genetic distances to its relatives at COI gene (0.1995 to its closest relative *G. margaritaceus*). Moreover, it differs from *G. tolsoni* in having more scales around the eye (10-13 *vs*. 6-9), a greater body depth at anus (21-24 *vs*. 16-22% SL) and by the colourful pattern of the male. It differs from *G. margaritaceus* in having always 14 pectorals rays *vs*. 14 or 15 rays, more scales in backward series (10-12 *vs*. 9-10) and by the colourful pattern of the male.

Conclusion

Giuris species are widely distributed and found in insular freshwater habitats of the tropical Indian and Pacific oceans. Several surveys of rivers have been carried out in Indonesia during past 10 years into remote areas of West Papua, Sulawesi, Kalimantan, Sumatra, Sunda Islands (Java, Lombok, Bali) and Moluccas (Halmahera, Ambon and Ceram), and the genus has been collected in many coastal streams from estuaries to lower parts of rivers, or in lakes, usually in bank vegetation and in shelters over rocky or gravel bottoms. Our study shows that finally three species exist in Indonesia (out of the eight known species (see Keith *et al.,* 2020, this volume): two with a widespread distribution in the Pacific (*G. margaritaceus* and *G. viator* n. sp. (this paper)), and one with a more restricted distribution and known from Indonesia, Philippines and Taiwan.

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